REMARKS

By this amendment, applicants have amended claims 1 and 6 to include therein the limitations previously recited in dependent claims 10 and 20, respectively. Accordingly, claims 19 and 20 have been cancelled without prejudice or disclaimer. Claims 1 and 6 have also been amended to delete the phrase "each as an independent dopant" in order to overcome the rejection of the claims under 35 U.S.C. §112, second paragraph. Applicants have also added claims 21 and 22 to further define the invention. See, e.g., the paragraph bridging pages 7 and 8 of applicants' specification.

Claims 15 and 16 stand rejected under 35 U.S.C. §112, first paragraph, the Examiner alleging the specification to fail to comply with the enablement requirement, i.e., to not enable the subject matter of claims 15 and 16 wherein the light-emitting molecule is directly surrounded by the spin conversion material. Applicants traverse this rejection and request reconsideration thereof.

The Examiners' attention is respectfully directed to Figure 1 and the description thereof in applicants' specification. In particular, Figure 1 shows a light-emitting layer 14 which has a spin conversion material (the main component) 14a and light-emitting molecules 14b. Figure 1 clearly shows the light-emitting molecules 14b directly surrounded by the spin conversion material 14a. Accordingly, the application, especially Figure 1 and the description thereof, clearly enables those skilled in the art to make and use the subject matter of claims 15 and 16, e.g., wherein the light-emitting molecule is directly surrounded by the spin conversion material. Accordingly, reconsideration and withdrawal of your rejection claims 15 and 16 under 35 U.S.C. §112, first paragraph, are requested.

In view of the foregoing amendments to claims 1 and 6, it is submitted that all the claims in the application, including claims 13-20, comply with the requirements of 35 U.S.C. §112, second paragraph. Accordingly, reconsideration and withdrawal of the rejection of claims 13-20 under 35 U.S.C. §112, second paragraph, are requested.

Claims 1, 3 - 6 and 8 - 16, 19 and 20 stand rejected under 35 USC 102(e) as being anticipated by US Patent No. 6,310,360 to Forrest et al. Applicants respectfully traverse this rejection and request reconsideration thereof.

The present invention relates to an electroluminescent film device in which the light-emitting layer contains the spin conversion material set forth in the claims and a light emitting molecule mixed into the spin conversion material. This would have neither disclosed nor suggested by Forrest et al.

The difference in the structure between the present invention and Forrest et al attains the advantageous effect as described below.

The excited state generated in the light-emitting layer has a statistical annihilation life and an average movement length. Prior to expiration of life, part of the excited state moves to the light-emitting molecule and is converted to a photon while part of the excited state is captured by devitalizing defects and extinguished without light emission. Moreover, a triplet excited state does not contribute to the light emission of a single light emitting molecule. Therefore, in order to enhance light emission efficiency, it is quite important that the excited state rapidly moves to the light-emitting molecules to emit light. The light emission efficiency is remarkably enhanced by shortening the distance between a portion which has a spin conversion function and the light-emitting molecule.

In this respect, it is advantageous that a light-emitting molecule is mixed into the spin conversion material as set forth in claims 1 and 6. It is also preferable that the light molecules are directly surrounded by the spin conversion material as set forth in new claims 15 and 16.

Forrest et al would not have disclosed or suggested the claimed structure or the advantageous effect obtained thereby.

Forrest et al describes a material in which, on a base material composed of CBP (4,4'-N,N'-dicarbazole-biphenyl), there are separately provided a layer to which a spin conversion material is added, and another layer in which a light-emitting molecule is added, as shown in Fig. 1. In the present invention, on the other hand, a spin conversion material, a light-emitting molecule and a base material are simultaneously deposited, and molecules of these materials are present in a mixed state. Thus, the material in Forrest et al is clearly different from the material of the present invention in structure, and not just in the process in which the material is made.

In Forrest et al, the light-emitting molecule is in a different layer than the spin conversion material; thus, the average distance between the spin conversion material and light-emitting molecule is approximately 10 to 100 times greater. Thus, the possibility of failure in light emission owing to extinguishment of the exciton is higher, and a considerable number of the excitons disperse in a direction opposite to the light-emitting layer, resulting in extinguishment without light emission. In the present invention, on the other hand, the materials are mixed as described above so that efficiency of light emission is higher as compared with that of the structure of Forrest et al wherein the three materials are contained in the separate layers. (Incidentally, the light emission efficiency is further improved when a spin conversion

material is used as a base material.) The structure of the present invention and the advantages obtained thereby are neither disclosed nor suggested by Forrest et al.

The Examiner, noting the disclosure at column 14, lines 65 - 67 of Forrest et al, alleges Forrest et al to teach that further improvement may be expected by mixing the host, phosphorescent sensitizer and fluorescent dye. However, the Examiner's allegation amounts to nothing more than an allegation of "obvious to try." Clearly, such an allegation does not satisfy the level of evidence necessary to support an obviousness rejection, much less an anticipation rejection.

The Examiner also notes the disclosure at column 15, lines 25-60 of Forrest et al. This disclosure constitutes a "Prophetic Example" in which the electron transporting layer is composed of three different materials, a traditional electron transporting material (such as Zrq4), 15% of an intersystem crossing agent (such as benzil; or other ISC agents found in the reference to Gilbert and Baggott mentioned previously in the patent) and 5% of a phosphorescent emitter (such as PtOEP).

However, no part of the Forrest et al. patent discloses or would have suggested the electroluminescent film device presently claimed in which the light-emitting layer consists essentially a spin conversion material and a light-emitting molecule mixed into the spin conversion material.

While the Examiner alleges that the host material in Forrest et al., e.g. CBP, does not materially alter or affect the properties of the light-emitting layer, the Examiner has no basis for this conclusion. To the contrary, as noted above, since the spin conversion material and light-emitting material are mixed, the efficiency of light emission is higher according to the present invention. The use of a base material or a traditional electron transporting material in addition to a spin conversion

material and a light-emitting molecule would materially alter or affect the properties of the light emitting layer.

For the foregoing reasons it is submitted that Forrest et al. patent does not disclose and would not have suggested the presently claimed invention.

Claims 1, 3-6, 8-10 and 13-20 stand rejected under 35 U.S.C. §102(e) as allegedly being anticipated by United States Patent No. 6,303,238 to Thompson et al. Applicants traverse this rejection and request reconsideration thereof.

The patent to Thompson discloses organic light emitting devices in which the emissive layer contains a phosphorescent dopant compound, e.g., PtOEP, in an electron transporting layer, e.g., Alq_3. However, while PtOEP is a light emitting molecule, the material in which it is mixed, e.g., Alq_3 is not a spin conversion material as defined in applicants' claims. To the contrary, the present claims require a light emitting molecule (which may be, e.g., PtOEP as set forth in claims 21 and 22) mixed in a spin conversion material in which the quantum number of orbital angular momentum and the quantum number of excited state spin are convertible into each other by their interaction and wherein the material is a molecule in which a heavy metal atom is bonded or coordinated to an organic material. Alq_3 is not a spin conversion material in which the quantum number of orbital angular momentum in the quantum number of excited states pin are convertible into each other by their interaction and wherein the material is a molecule in which a heavy metal atom is boned to or coordinated to an organic material.

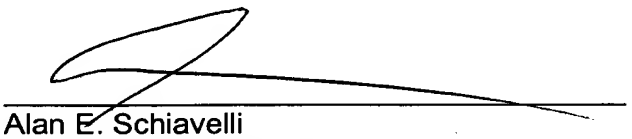
Accordingly, the Thompson et al. patent does not disclose and would not have suggested the presently claimed invention.

In view of the foregoing amendments and remarks, favorable reconsideration and allowance of all of the claims now in the application are requested.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 500.40580X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP



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